

## REMARKS

By the present communication, Claims 1, 6, 12, 32, and 37 are amended. Claims 12-24 are withdrawn from consideration. Support for the claim amendments can be found throughout the application as filed, including, but not limited to, paragraphs [0013], [0037], [0042] through [0044], and [0060] through [0062]. Upon entry of the present amendment, Claims 1-11, and 32-37 are pending and under examination in this application. Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

### **I. Claim Rejections Under 35 U.S.C. §§ 102(a) & 102(e)**

In Section 4 of the Final Office Action, dated May 11, 2007, Claims 1-9 and 32-37 stand rejected under 35 U.S.C. §§ 102(a) and 102(e) as allegedly anticipated by PCT International Publication No. WO 02/054052 (herein "Fish"). Applicants respectfully traverse the rejection. Fish does not teach the particular arrangement of nanocylinders, substrate, and biomolecules of instant claims 1, 32, and 37. Therefore, the claims are not anticipated by this reference.

In the Advisory Action dated November 29, 2007, the PTO states that

[T]he specification yields no limiting definition of the instantly claimed "biomolecules" as being limited to single stranded nucleic acids; i.e. the specification does not prohibit the biomolecule from being a double stranded nucleic acid molecule having one strand covalently linked to a surface or a nanotube. Thus, as detailed in the Previous Office Action, the instantly claimed "at least one biomolecule" is interpreted as the double stranded nucleic acid formed [*sic*] by hybridization between analyte 15A and binding agent 16, which is covalently linked to substrate 20 (Figures 2C-D of Fish et al). The complementary biomolecule 26a, which is covalently attached to nanocylinder 26, hybridizes to the covalently bound double stranded biomolecule (15a+16) as illustrated in Figure 2C. Thus, the covalently surface-bound double stranded biomolecule, in the form of 15a hybridized to 16, attaches nanocylinder 26 to surface 20 through biomolecular interaction of hybridization between the covalently nanocylinder-bound

complementary biomolecule 26b and the covalently bound double stranded biomolecule 15a+16, and the claim has been given the broadest reasonable interpretation consisting with the teachings of the specification regarding “biomolecules”. (Advisory Action, p. 2, emphasis added).

Applicants submit that independent Claims 1, 32 and 37, as amended, are not susceptible to the interpretation described above. The amended claims recite that the at least one nanocylinder is attached to the surface through specific binding between the at least one biomolecule covalently linked to the surface and the at least one biomolecule covalently linked to the at least one nanocylinder, and wherein the at least one nanocylinder is not attached to the surface through a third biomolecule that undergoes specific binding with the at least one biomolecule covalently linked to the surface and the at least one complementary biomolecule linked to the at least one nanocylinder.

The claims cannot reasonably be interpreted to encompass the arrangement taught by Fish. Binding between a partially double stranded nucleic acid molecule and another nucleic acid (as depicted in Fish) is not encompassed by the claim for at least two reasons. First, Fish does not teach specific binding between the at least one biomolecule covalently linked to the surface and the at least one biomolecule covalently linked to the at least one nanocylinder. Fish only teaches specific binding between the analyte 15 and the covalently-bound biomolecules 26b and 16. The portion of the double-stranded molecule 15a which hybridizes to 26a is not covalently attached to the substrate—it is attached non-covalently via hybridization. Thus, Fish fails to teach specific binding between the two covalently bound biomolecules.

Second, amended claims 1, 32, and 37 include a proviso that specifically excludes the arrangement taught by Fish. The instant claims recite that the at least one nanocylinder is not attached to the surface through a third biomolecule that undergoes specific binding with the at least one biomolecule covalently linked to the surface and the at least one complementary biomolecule covalently linked to the at least one nanocylinder. The specification describes this arrangement in paragraph [0037]:

In accordance with one embodiment of this invention, a nanocylinder is attached to a surface through biomolecular interactions between a biomolecule bound to the surface and a complementary biomolecule covalently linked to the nanocylinder. The biomolecule bound to the surface may be bound through one or more covalent or non-covalent linkages, or a combination thereof.

Thus, the specification describes that some embodiments of the present invention may involve a direct (i.e., specific) binding between a biomolecule covalently linked to the surface and a biomolecule covalently linked to the nanocylinder. This arrangement does not encompass indirect attachment of the nanocylinder to the surface *via* a third biomolecule, as taught in Fish. Consequently, Fish fails to teach all elements of the independent claims. For at least these reasons, Applicants respectfully submit that Fish does not disclose each of the claim limitations required by Claims 1, 32, and 37. As such, Applicants respectfully request withdrawal of the rejection of Claims 1, 32, and 37, and dependent Claims 2-11 and 33-36 which depend from Claims 1 and 32, respectively.

## **II. Claim Rejections Under 35 U.S.C. § 103(a)**

Claims 1, 10, and 11 stand rejected under 35 U.S.C. § 103(a) as obvious over Fish in view of Strother et al (*J. Am. Chem. Soc.* 122: 1205-1209 (2000)). According to the PTO, “Fish does not explicitly teach an amine-terminated nanocylinder with a molecule comprising a maleimide group and linkage of the maleimide group to a thiol group. However, Strother et al teach attachment of biomolecules to surfaces using maleimide derivatives” (Office Action, p. 9). Applicants respectfully traverse the rejection.

Applicants submit that a *prima facie* case of obviousness has not been established. The combination of references cited by the PTO fail to teach or suggest all elements of the claimed invention. For the reasons described in Section I above, Fish fails to teach or suggest an arrangement wherein the at least one nanocylinder is not attached to the surface through a third biomolecule that undergoes specific binding with the at least one biomolecule covalently linked

to the surface and the at least one complementary biomolecule linked to the at least one nanocylinder.

Moreover, Fish does not teach or suggest that specific binding between this pair of complementary biomolecules allows for attachment of the at least one nanocylinder to the surface. The deficiency of Fish is not cured by the teachings of Strother et al. As such, the cited references, either alone or in combination, do not teach or suggest all elements of independent claims 1, 32, and 37. A *prima facie* case of obviousness has not been established. Applicants respectfully request withdrawal of the rejection of claims 1, 10, and 11.

### **III. Rejoinder**

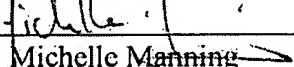
As acknowledged in the Office Action dated June 13, 2006, page 3, upon allowance of the Group I product claims, the withdrawn Group II claims 12-24 will be rejoined. Applicants respectfully submit that claims 1-11 and 32-37 are now in condition for allowance as described above. Rejoinder and allowance of withdrawn subject matter, including claims 12-24 is respectfully requested.

### **III. Conclusion**

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

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